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14. ABSTRACT The grant covered funding for three International Solid Freeform Fabrication Symposia, held at The University of Texas at Austin in August of 2010, 2011 and 2012. The Symposia were organized in a manner to allow the multidisciplinary nature of the SFF research to be presented coherently, with various sessions emphasizing computer interfacing and modeling, machine and process development and materials and materials processing for SFF. The three-day event was completely composed of individual oral presentations to accommodate the demand for this dissemination format. The parallel sessions were split into three sessions to meet demand, and a poster session allowed researchers to present in this format. We believe that documenting the changing state of the art in additive manufacturing as represented by the meeting proceedings serves both the people presently involved in this fruitful technical area as well as the flux of new researchers and users entering the field.					
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Final Report – ONR Grant N00014-10-1-0528
International Solid Freeform Fabrication Symposium
An Additive Manufacturing Conference
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A. Description of the Technical Research or Development Goals:

The purpose of this grant request was to secure participant support for the Annual International Solid Freeform Fabrication Symposium – An Additive Manufacturing Conference. Three conference years were funded, 2010, 2011 and 2012.

The International Solid Freeform Fabrication Symposium is held at The University of Texas at Austin every August. The Symposium is organized in a manner to allow the multidisciplinary nature of the SFF research to be presented coherently, with various sessions emphasizing computer interfacing and modeling, machine and process development and materials and materials processing for SFF. For each of the grant conferences, the three-day event was completely composed of individual oral presentations to accommodate the demand for this dissemination format. The parallel sessions were split into three sessions to meet demand, and a poster session allowed researchers to present in this format. We believe that documenting the changing state of the art in additive manufacturing as represented by the meeting proceedings serves both the people presently involved in this fruitful technical area as well as the flux of new researchers and users entering the field.

This conference serves as a meeting opportunity for researchers. The networking aspect of the conference is strong and includes students who are able to meet and discuss research with world-class leading experts in the field.

B. Significant Research or Development Results:

The table captures the salient metrics for the 2010-12 SFF Symposia.

Year	Total Participants	Students	Universities	Industries	Govt
2010	149	58	40	23	5
2011	159	63	34	27	1
2012	169	46	35	18	7

Year	Total Presentations	Oral Presentations	Posters	Proceedings Papers	No. Pages in Proceedings
2010	110	88	22	80	965
2011	95	77	18	56	767
2012	114	96	18	72	1075

Each year, there was a special session on a topic of both broad interest to the community and also specific interest to the Navy. In 2010, a special plenary session was organized on government issues in additive manufacturing. Speakers represented NAVAIR, NASA

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Langley, AFRL and NIST. In 2011, a special plenary session was organized on sustainability in additive manufacturing. Speakers were leading experts in the field. In 2012, a special plenary session was organized on the societal impact of additive manufacturing. Speakers were leading experts in the field. The session was introduced by Terry Wohlers of Wohlers Associates, a leading expert in the AM market. Overview presentations were made on the impact of AM in the United Kingdom, China and the United States. Several university technology transitioning programs were presented, including efforts by the University of Texas at El Paso to reach out to minorities, Georgia Tech's MENTOR Program targeted for high school students and a jointly developed AM design curriculum at The University of Texas at Austin and Virginia Tech. There was a presentation by the Chair of the ASTM F42 Additive Manufacturing Technical Committee (Stucker) on the impact standards are making in society. The session closed with a perspective presentation by Ian Gibson, a professor at the National University of Singapore, Regional Editor of the *Rapid Prototyping Journal* and longtime member of the AM community.

Two awards were created and first presented in 2009: the International Freeform and Additive Manufacturing Excellence (FAME) Award and the International Outstanding Young Researcher in Freeform and Additive Manufacturing Award. These awards are designed to recognize outstanding research in the field and to encourage young researchers. The recipients for the contract years are:

International Freeform and Additive Manufacturing Excellence Award

2010	Gideon Levy	iRPD-Aspire AG
2011	Dave Bourell	University of Texas at Austin
2012	Jean-Pierre Kruth	Katholieke Universiteit Leuven

Intl Outstanding Young Researcher in Freeform and Additive Manufacturing Award

2010	Peter Mercelis	LayerWise N.V.
2011	Candice Majewski	Sheffield University
2012	Christopher Williams	Virginia Tech University

Information on the SFF Symposium was made available through the worldwide web at <http://utwired.engr.utexas.edu.lff/>. On-line registration forms, hotel information, general information brochure, proceedings order form, maps and the previous year's talk titles were all available. The SFF Symposium mailing address is sffsymp@uts.cc.utexas.edu.

According the Wohlers Report 2005, 'The SFF Symposium is an excellent model for advancing discovery and understanding while promoting teaching, training, and learning.' We are pleased to report that the SFF Symposium attracted a large number of young scientists this year

In addition to the benefits of direct meeting participation, all participants were able to network with the international additive manufacturing research community. Wider dissemination was accomplished through the proceedings. Authors contributed

manuscripts both non-reviewed and reviewed to allow authors the option of presenting their work in a refereed format.

The SFF Symposium serves as a primary forum for networking and dissemination of information dealing with research issues in freeform fabrication. According to Ian Campbell, senior editor of the *Rapid Prototyping Journal*, "The SFF Symposium is to be regarded as the foremost international conference for rapid prototyping research." RPJ, 9#1, 2003. Outstanding presentations from the 2010 SFF Symposium were selected for inclusion in a special issue of the *Rapid Prototyping Journal*. The special issue of outstanding papers appeared as Volume 16#3 in 2010 and Volume 17#3 in 2011. The SFF Symposium Conference Proceedings are heavily cited in the archival literature, and it is anticipated that the 2012 Proceedings will be as well.

Additive Manufacturing is an extremely broad and interdisciplinary field, encompassing mechanical engineering, electrical engineering, aerospace engineering, biomedical engineering, computer science and engineering, biology, design, materials science and engineering, manufacturing science. The topics covered at the SFF symposium impact the automotive, aerospace, orthopedics, dentistry, gaming, surgical planning, implants, marine, architecture, furniture, art, etc. The conference served as a forum for this diverse interdisciplinary group of researchers to gather for the purpose of synergistic interaction and sharing of ideas and progress.

The Proceedings of the Solid Freeform Fabrication Symposium is a significant contribution to the research literature in the field. The proceedings represent a concise annual corpus of 600-1000 pages detailing research in freeform fabrication back to 1990. The proceedings are heavily cited in archival literature including the *Rapid Prototyping Journal*. The SFF Proceedings have been uploaded in their entirety onto the conference website, providing citation-based access to all manuscripts from 1990-2012 (<http://utwired.engr.utexas.edu/lff/symposium/proceedingsArchive/toc.cfm>). Emphasized is that the entire 2012 conference proceedings is available on line at this URL to anyone at no charge.